

APPENDIX 1

Several Ways We Study the Forest: Forest Inventory and Ecological Land Classification

Information Systems That Help Us Understand the Status and Capability of Our Forests

Wisconsin's forests have been studied since people have lived here. Field notes from the original land survey, begun in 1830, were analyzed and compiled by R. W. Finley into his famous map of the presettlement vegetation of Wisconsin [Finley 1976] which is shown juxtaposed with a map of current vegetation on pp. 102–103. The USDA Forest Service has conducted inventories of

Wisconsin's forests since the 1930s. It is very helpful to have such a consistent long-term data base on one of the state's primary natural resource systems.

In recent years, much attention has been drawn to the need to recognize ecological relationships and the complexity of these interrelationships in time and space. In making resource management decisions, it is now common to look not only at a given site or area, but also at larger scale areas that share similar structure, function, and composition. Several different systems provide us with a framework for gathering, organizing, analyzing, interpreting, and presenting ecological information. They provide a common language for communication, and they facilitate management based on knowledge of ecological potential of the land.

Following is a brief introduction to some of the systems that we use to study and track the status of Wisconsin's forest ecosystem. Although there are many other informational systems that pertain to forest management, the ones described below are the main systems from which information was derived for this assessment report.

US FOREST SERVICE INVENTORY

To track the basic status and condition of Wisconsin's forests, we conduct an annual forest inventory, which is part of a national inventory conducted by the USDA Forest Service. The Forest Service has conducted the Wisconsin forest inventory on a periodic basis in 1936, 1956, 1968, 1983 and 1996. Forest Service field crews collect inventory data from a random selection of grid plots across the state. For the 1996 inventory, field measurements were taken on about 9,000 forested plots. Inventory data provides information on timberland acres and growing stock; sawtimber volume, growth, mortality, and removals; the status of Wisconsin's forests; and trends in forest composition.

Inventory data historically has been reported in terms of **forest types** and **species groups**. Successional changes, species specific insect and disease problems and mortality, forest product desirability and harvest levels are all well defined by forest type acreage and/or species group volume changes over time.

A forest type is a classification of forest land based on the species forming the best represented majority of all live trees \geq 1-inch diameter. Most common forest types in Wisconsin are maple-basswood, aspen and oak-hickory. **A species group** is a grouping of individual tree species, such as quaking aspen and bigtooth aspen, into a single family group, in this case aspen.

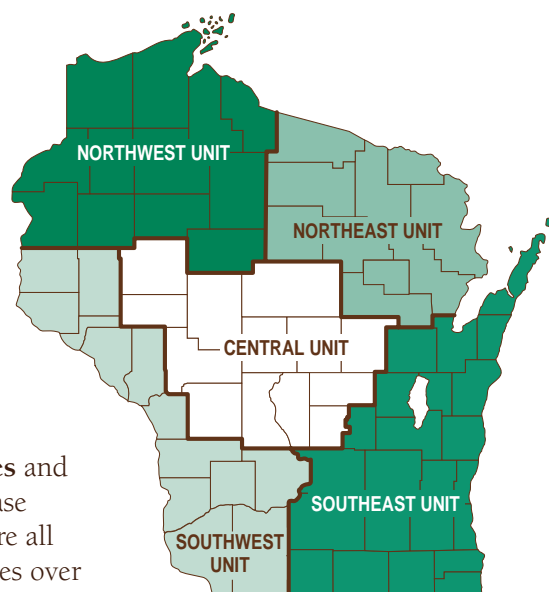


Figure 28

Forest Survey Units in Wisconsin

NATIONAL HIERARCHICAL FRAMEWORK OF ECOLOGICAL UNITS (NHFEU)

The National Hierarchical Framework of Ecological Units (NHFEU) is an ecological classification system that divides landscapes into ecologically significant regions at multiple scales. Ecological types are classified and units are mapped based on associations of biotic and environmental factors which include climate, geology, physiography, soils, hydrology, and potential natural communities. In Wisconsin, the Provinces, Sections, Sub-sections, and Landtype Associations of the NHFEU have been delineated and are being used as large-scale ecological units for resource assessment and planning projects. The development of these important layers of information have supplied a spatially oriented, ecological classification tool that is available to a variety of landowners, land managers, and resource interest groups in Wisconsin and the Lake States. The NHFEU provides a basis for assessing resource conditions at multiple scales – from assessing resource capability at large scales to assessing site specific conditions such as distributions of terrestrial and aquatic biota and forest growth, succession, and health.



Figure 29

Section level of NHFEU for Wisconsin

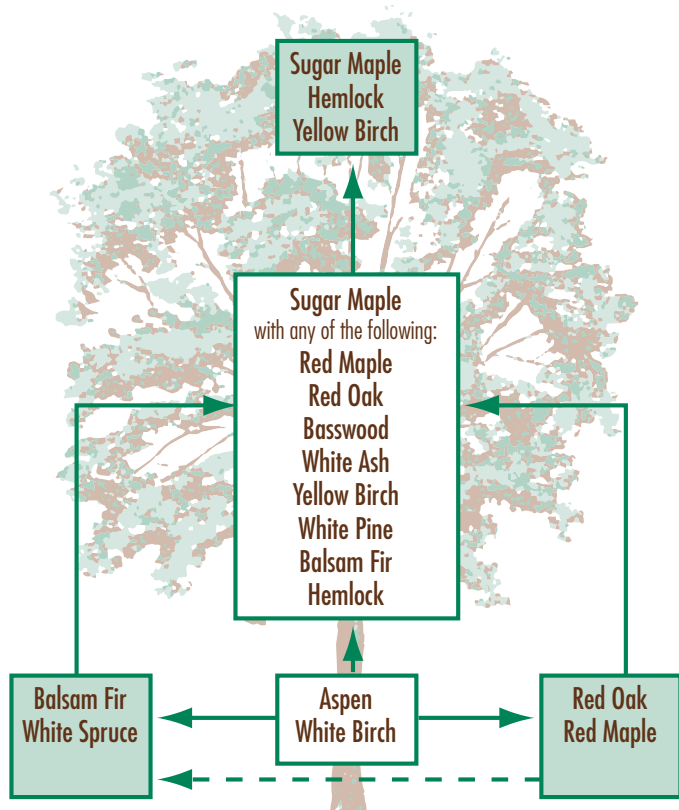


Figure 30

Acer-Tsuga-Maianthemum (sugar maple-hemlock-wild lily of the valley) Habitat Type Successional Diagram

FOREST HABITAT TYPE CLASSIFICATION SYSTEM (FHTCS)

The FHTCS, developed in the 1980s and 1990s, is a natural classification system for forest communities and the sites on which they develop. It is a site classification system based on the composition of plant communities. It groups land units with similar capacity to produce vegetation. The system integrates those environmental factors that affect species reproduction, growth, competition, and community development. Each habitat type represents a segment of environmental variation with a certain potential for vegetation development.

The FHTCS provides a guide to common site types and upland forest plant communities of Wisconsin. It can be applied to research, forest management, and communication. The system provides an ecological framework for the systematic gathering of data for the development of management interpretations, objectives, and prescriptions. It specifies potential community changes over time, with or without disturbance. It describes potential community composition, competition, and development, as well as site and distributional characteristics. Knowledge of ecological potentials can improve forest management decision making.

THE NATURAL HERITAGE INVENTORY (NHI)

Wisconsin's Natural Heritage (NHI), established in 1985, is maintained by the DNR Bureau of Endangered Resources. The NHI program is responsible for maintaining data on the locations and status of rare plant and animal species, natural communities, and unique geological features and animal aggregation sites (such as bat hibernacula) in Wisconsin. The Wisconsin NHI program is part of an international network of inventory programs that collect, process, and manage data on the occurrences of natural biological diversity. This network is coordinated by The Nature Conservancy (TNC), an international non-profit organization. NHI provides useful information for developing management plans for specific properties and also for determining landscape-scale patterns and connections that cross property or political boundaries.

How Are These Systems Used Together?

These information systems are used together by foresters, ecologists, and planners for a wide variety of uses. Following are some examples:

The Wisconsin Forest Accord: Classification systems provide managers and scientists with a common language for describing forest sites, communities, and landscapes, as well as management expectations. As a result of a joint effort led by the University of Wisconsin-Madison and the Wisconsin DNR Bureau of Forestry, representatives of public, industrial, and private landowners and land

managers agreed in 1994 to adopt the National Hierarchical Framework of Ecological Units (NHFEU) and the Forest Habitat Type Classification System (FHTCS) as a common language to characterize the ecological potential of forested sites. Called the “Wisconsin Forest Accord,” this memorandum of understanding resolves that the variety of landowners involved with the Accord will describe, evaluate, and share critical ecological information concerning the forested landscape.

Northern Forest Master Planning: In preparation for revising existing state forest master plans, the DNR Forestry program initiated a series of assessments of the Northern State Forests, published in 1999. Among these was an assessment of regional ecology, which used information from the National Hierarchy Framework of Ecological Units to describe in detail the overall regional ecological picture in which several of the Northern State Forests lie and to analyze ecological management opportunities for specific State Forest properties. Natural Heritage information, Forest Inventory data, and general Forest Habitat Type Classification System information was also used to describe the natural resources of northern Wisconsin. This regional ecological assessment provides a more detailed level of ecological understanding of the forest’s past, present, and future potential than we have ever had before. This assessment information feeds into the master planning process, which combines a public participation process with the best available information to derive revised master plans for Wisconsin’s Northern State Forests that balance the ecological, social, and economic benefits of the forests.

Tablemaker: Tablemaker is a software program developed by the USDA Forest Service Forest Inventory and Analysis Program. It provides the ability to extract data from the Annual Forest Inventory and organize the information into any defined area, including ecological units (using the National Hierarchy Framework of Ecological Units). With this software, forest statistics for a given property (derived from a separate set of calculations) can be compared with statistics for a larger surrounding area (such as an ecological unit) and therefore assessed in relation to the larger landscape. Questions such as the following can be answered:

- ▲ Is this property unique, rare or common relative to specific variable(s) or composition on the larger landscape?
- ▲ Where does the property “fit in” in productive capability compared to the surrounding landscape?
- ▲ Can attributes of the property be changed or maintained to benefit the larger landscape while considering property capabilities and conditions as well as the landowner’s objectives.



These are just a few examples—ranging from broad multi-party agreements to site-specific analyses—of the ways that current information tools and technology can help us understand and thoughtfully manage Wisconsin’s forest resources. With continued development and refinement of such tools, we are able to provide useful information to those interested in participating in planning processes, and we are able to gauge the effectiveness of our management decisions over time.

Figure 31

Vegetation cover of Wisconsin in the mid-1800s, compiled from U.S. General Land Office Notes by Robert W. Finley, 1976.

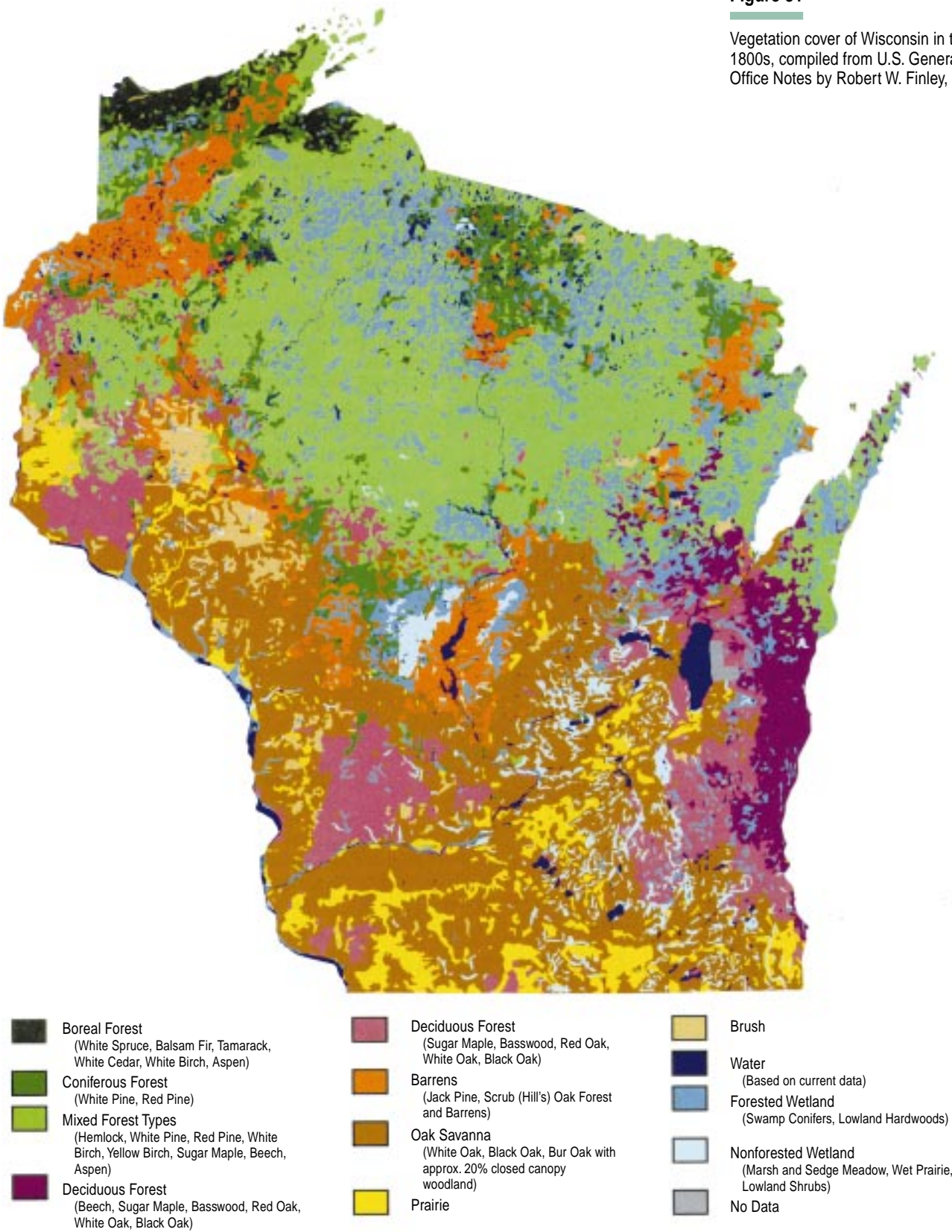


Figure 32

Land-use and land cover for Wisconsin, compiled from high-altitude aerial photography taken from 1971–81.

